STATE PLANT
BOARD OF
FLA. LIBRARY

UNITED STATES

DEPARTMENT OF AGRICULTURE

1862 1889

BUREAU OF
ENTOMOLOGY AND PLANT QUARANTINE
NEWS LETTER

VOLUME VIII 2

2-1-41

1/18/41

Digitized by the Internet Archive
in 2013

http://archive.org/details/newsletter40no2

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR DECEMBER 1940

Vol. VIII, No. 2 (Not for publication) February 1, 1941

ADMINISTRATION

F. A. Johnston Dies

Frederick Andrew Johnston, plant quarantine inspector of the Division of Foreign Plant Quarantines, passed away in a hospital in Mayaguez, P. R., at 2:30 p. m. on January 22, 1941, following a brief illness.

Mr. Johnston, the son of Andrew and Lydia A. (McCorkle) Johnston, was born at Westford, Mass., on May 25, 1887. He attended grammar school and academy at Westford, and in 1908 graduated from the Massachusetts Agricultural College at Amherst with a degree of Bachelor of Science, having majored in entomology. He did postgraduate work at the same institution from 1908 to March 1910. During these years he served as deputy State nursery inspector of Massachusetts.

He was appointed to the Bureau of Entomology on March 1, 1910, as agent and expert and later as an entomological assistant with the Division of Truck Crop and Stored-product Insects. On October 16, 1920, he was transferred to the Federal Horticultural Board as plant quarantine inspector, with headquarters at Nogales, Ariz., where he served in various capacities. On August 1, 1926, he was called to Washington to assist the entomologist and executive officer of the Federal Horticultural Board in the administration of the work of the Mexican Border Inspection Service. Following a reorganization, on October 1, 1928, he was placed in charge of the Port and Mexican Border Inspection Service. On March 21, 1940, he was transferred to Puerto Rico as Inspector in Charge at San Juan, with the direction of all the Federal plant quarantine activities on the Island.

During his career as research entomologist Mr. Johnston published the following: Arsenite of Lead and Lead Chromate as Remedies against the Colorado Potato Beetle (Bul. 109, Part V); The Life History of _Tetrastichus asparagi_ Crawf. (Journ. Econ. Ent. v. 5); Feeding Habits of _Pimpla (Itoplectis) conquisitor_, Say with H. M. Russell (Journ. Econ. Ent. v. 6); Asparagus Beetle Egg Parasite (Journ. Agr. Research, v. 4).

Mr. Johnston is survived by his wife Cornelia G. (Havens) Johnston, whom he married in 1915, and two children, Doris H. (Mrs. W. C. Clark of Buffalo) and Frederick A. Jr., who is now with the Federal Bureau of Plant Industry at Gainesville, Fla.

1942 Budget Estimates for Appropriations to Bureau

The regular Budget estimates for appropriations for the fiscal year 1942 recently submitted to Congress include the following changes in amounts appropriated to the Bureau for the current fiscal year:

Increases

Mexican Fruitfly Control	$ 7,500
Barberry Eradication	20,000
Insecticide and Fungicide Investigations	5,000
Foreign Plant Quarantines	20,000

Decreases

Citrus Canker Eradication (item eliminated)	$13,485
Dutch Elm Disease Eradication	100,000

To conform with general authorizing legislation approved April 26, 1940, the Bureau's appropriation item for Blister Rust Control is transferred to and made a part of a special new appropriation which relates specifically to White Pine Blister Rust Control and provides appropriations for the Bureau of Entomology and Plant Quarantine and the Forest Service in the Department of Agriculture and for land-managing agencies in the Interior Department. The amount estimated for work to be carried on under the direction of the Bureau is increased by $100,000 in the combined estimate.

EDITORIAL OFFICE

Preparation of Manuscripts

The work of the Editorial Office would be greatly expedited if authors would follow the instructions available to them for the preparation of manuscripts. For practically all types of manuscripts to be published by the Department the instructions given on the inside of the back cover of each issue of the Journal of Agricultural Research may be followed. Similar instructions may be found in the same place in the Journal of Economic Entomology. For papers intended for publication in other outside journals the style for the particular journal should be followed, so far as that can be ascertained, but in the absence of such specific information the approved style of the Department of Agriculture should be used. If such specific policy has been followed, a statement to that effect should be made in the letter of submittal.

Miscellaneous Publication 337, entitled "Abbreviations Used in the Department of Agriculture for Titles of Publications," should be followed in citing literature in Department publications and also in papers for outside publications, unless the specific style used in the outside journal can be ascertained. Another (unnumbered) publication of the Department, "Citations to Literature in the Journal of Agricultural Research, Technical Bulletins, Circulars, and Miscellaneous Publications (Other than Bibliographies)," compiled by Carolyn Whitlock, gives further directions for citing literature in the Department publications.

FRUIT INSECT INVESTIGATIONS

More on ethylene dichloride emulsion against peach borer.--Oliver I. Snapp, of the Fort Valley, Ga., laboratory, reports that while at Beltsville, Md., early in the fall he had an opportunity to make observations on the results obtained by F. P. Cullinan and D. F. Scott, of the Bureau of Plant Industry, from treating 1-year-old peach trees in a variety planting at the United States Horticultural Station with ethylene dichloride emulsion for control of the peach borer (*Conopia exitiosa* (Say)). Each tree in this planting had been treated with 2 liquid ounces of 7½-percent emulsion 6 days prior to these observations. Not a single live borer was found, although the trees had been unusually heavily infested with the insect. There was no tree injury whatever from the treatment, which was of the strength and quantity of ethylene dichloride emulsion recommended for the control of the peach borer in 1-year-old peach trees.

Feeding injury on Muscat raisins.--Data concerning feeding injury by larvae of the raisin moth (*Ephestia figulilella* Greg.) on raisins of the Muscat variety have been obtained by George H. Kaloostian, of the Fresno, Calif., laboratory. At the end of the period of sun-drying on wooden trays, some of the raisins were placed in paper bags and fumigated (with incomplete success) while the infestation in the unfumigated lots was allowed to develop unchecked. Part of the unfumigated raisins were enclosed in paper bags at the end of sun-drying and the rest were exposed to further infestation during shade-drying on stacked trays. In the examination of samples for feeding injury all of the unfumigated raisins were grouped together. After the samples had been held for 38 days, 1,000 raisins from the fumigated lots and the same number from the unfumigated samples were examined under a microscope. The results were as follows.

Raisins	Injury at-- Capstem alone	Capstem and surface	Surface alone	Total
	Percent	Percent	Percent	Percent
Fumigated-----	15.6	1.0	1.1	17.7
Unfumigated--	39.6	12.7	7.4	59.7

The data indicate that the greater part of the feeding was in the pulp around the capstem, and that bagging and fumigation at the end of sun-drying considerably reduced feeding injury.

MEXICAN FRUITFLY CONTROL

Conditions and trapping results in December.--In December, 12 *Anastrepha ludens* Loew were trapped on 11 premises in 6 districts in the regulated area. In addition to these flies there were trapped 304 specimens embracing 8 other species in the family Trypetidae. This list includes specimens of *A. serpentina* Wied., *A. distincta* Greene, *A. mombinpraeoptans* Sein, *A. chiclayae* Greene, *A.* sp. "Y", *Anastrepha* sp., *A. pallens* Coq., and *T. curvicauda* Gerst. On the Mexican side of the river 22 *A. ludens* were trapped in Nuevo Laredo and 23 at Matamoros. Very beneficial heavy rains fell in December. A total of 6.95 inches was recorded at Brownsville throughout the month, but amounts considerably in excess of this figure were unofficially recorded at various points in the valley. The rains occurred over a period of several days and fell so slowly as to permit the soil to absorb most of it. High winds on December 26 and 27 reached a recorded velocity of 43 miles an hour at Brownsville. These winds continued for such a long period and at such a high rate that they caused an estimated 25 percent of the remaining grapefruit crop to fall. Much of the fruit remaining on the trees was severely damaged and a considerable portion of this is expected to fall in the near future. At the close of December 12,064.6 equivalent carlots of fruit had been moved from the regulated area. This amount is 652 equivalent carlots in excess of the movement for December 1939.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Methyl bromide unsuccessful as grain fumigant in elevator bins.--R. T. Cotton, Geo. B. Wagner, and T. F. Winburn, Manhattan, Kans., report that the fumigation of stored grain in elevator bins with methyl bromide has not proved successful, although several methods of applying the fumigant have been tested. One method of application consisted of introducing the liquid through a ½-inch metal pipe running from top to bottom in the center of a bin 80 feet deep, supplied with openings at every 10 feet of depth. A second method consisted of applying the entire dosage at the top of the bin but just below the surface of the grain. The third method consisted of introducing the fumigant in 1-pound cans that were tossed into the grain stream as the bin was being filled. Although dosages up to 3 pounds per 1,000 bushels of grain were applied, the kill of insects was incomplete in all cases. In order to overcome difficulties of distribution due to the low boiling point of methyl bromide, arrangements were made to obtain a 15-percent mixture of methyl bromide in the commonly used ethylene dichloride-carbon tetrachloride mixture. Preliminary tests made with this mixture in bins of shelled corn containing 2,000 bushels indicated that a dosage of 1½ gallons per 1,000 bushels applied to the surface gave excellent results.

Multi-walled paper bags vulnerable to stored grain insects.--Messrs. Cotton and Wagner also report that in an extensive test of multi-wall paper bags for protecting flour from insects it was found that, although the paper acts as an efficient barrier against flour-infesting insects with the exception of the cadelle, the prevailing method of closing the bottom of these bags defeats the purpose of their multi walls. The bottoms of most of these bags are closed by stitching, and the newly hatched larvae of flour-infesting insects were observed to enter the bags through the small holes made by the needle. An additional avenue of entry was afforded when the top of the bag was closed by sewing. Covering the sewed strip at top and bottom of the bag with a gum-latex tape eliminated this point of entry.

Chloroethyl formate as a stored-grain fumigant.--Mr. Cotton and J. C. Frankenfeld, Manhattan, state that preliminary tests with chloroethyl formate indicate that this fumigant has good insecticidal properties and may prove useful in connection with stored-grain fumigation. Germination tests with wheat of 12-percent moisture content showed that no injury to germination resulted from dosages required to kill stored-grain insects. This material has a boiling range of 127° to 140° C. and a flash point of 61° C.

Second generation of corn borer in Indiana and Ohio.--A. M. Vance, Toledo, Ohio, reports that data on midsummer pupation, indicative of a second generation of the European corn borer, were obtained during the fall infestation survey in August and September 1940 in 35 counties of Indiana and 43 counties of Ohio. Live or emerged pupae were found in 32, or 91.4 percent, of the Indiana counties and in 30, or 69.8 percent, of the Ohio counties. In Indiana in 1940, among 7,255 specimens of the borer observed, the pupation was 7.2 percent, which was significantly higher than that of 2.6 and 0.6 percent in 1939 and 1938, respectively, in the same group of counties. In Ohio in 1940, pupation averaged 6.4 percent among 2,207 individuals examined, being most pronounced in 8 counties in the southwestern corner of Ohio, where 29.6 percent of 152 specimens were found as live or emerged pupae in the fall.

Field status of European corn borer parasites in Lake States.--W. G. Bradley, Toledo, Ohio, reports on surveys made in October to obtain data relative to the status of parasites in the Lake States area at the close of the 1941 active season. Collections of ectophagous parasites and the puparial remains of those which issued from their host prior to the time of collection, together with living borers which might harbor ectophagous forms were collected at 6 points in the area. The total parasitization obtained at these points will not be determined until development is completed in the spring; however, from a cursory examination of the field-collected material, it seems evident that parasitization by the tachinid Lydella stabulans var. grisescens R. D. shows a tendency toward an increase at the 2 points where observations have been made annually to determine its status. At each of these points parasitization by the fall-emerging individuals was higher than by the total number of parasites at the close of 1939. In Perkins Township, Erie County, Ohio, the average parasitization within a radius of 1½ miles of the release point was 40.7 percent and 2 of the collections showed over 70-percent parasitization. The total number of borers observed at the 6 points was 2,648. In addition to the collections at release points, observations to obtain data on the dispersion of the exotic chalcid Eulophus viridulus Thoms. were made in the following 6 counties in Ohio: Sandusky, Seneca, Hardin, Auglaize, Logan, and Allen. Only 1 observation per township was made and only a few townships in some of the counties were included; however, E. viridulus was recovered at 1 or more points in each of the counties. Because of the method utilized in making this study, the chief objective of which was to check dispersion over as great an area as possible, no accurate data on the abundance of Eulophus were obtained, but it was indicated that at some points this parasite may be present in encouraging numbers. One colony was found over 50 miles from the nearest release point. The farthest limits of dispersion were not defined by this survey.

Severe tests imposed on hessian fly resistant wheats under greenhouse conditions.--W. B. Cartwright, D. W. LaHue, and C. Benton report that mass production of hessian flies in the greenhouses at Lafayette, Ind., has made practicable extended and critical tests on wheat varieties and strains not attainable in the field. Daily production of flies for experiments has often exceeded 5,000 adults which were confined in oviposition cages for infesting wheats. Under severe tests, individual varieties are infested with from several hundred to 1,000 or more fly eggs per plant and then subjected to contrasting environmental conditions with respect to temperature, light, and other factors. Under adverse conditions in the tests to date, several durum varieties and strains retain a resistance that approaches immunity. Most common wheats have not retained this high rate of resistance. The variability of results in the tests with common wheats has not been definitely attributed to any single factor or combination of factors but more extensive studies are now being made which include those of inheritance, environmental modifications, and variability of the fly populations. Included in the varietal tests, exclusive of hybrid lines, have been highly resistant plant selections from the durum varieties, as Branco, Aza de Corvo; Cascalvo, Monjil No. 2, Durazio rijo, Tremez preto, Tremez rijo, Tremez molle, and a few unnamed strains; and from the common wheats as Java, Dixon, Illinois No. 1-W38, Marvel, Beirao, Portugez, Ribeiro, Trijo roji, Rafael Triunfo, and several unnamed strains including some especially promising winter wheats from Turkey.

Fly-resistant wheat makes good showing in field test.--W. B. Noble, Sacramento, Calif., reports that in 1940 about 30 acres of Big Club 38 (Dawson X Big Club^{3}) fly-resistant wheat was grown for field test in Solano County, Calif. This wheat showed a 96-percent reduction of plant infestation and a 30-percent increase of yield, as compared with adjacent regular Big Club variety.

Insecticidal control of chinch bugs on corn.--E. V. Walter and Curtis Benton, Lafayette, Ind., state that numerous tests made during the summers of 1938-40 indicate that chinch bugs can be safely and effectively controlled on corn at a cost of approximately $2.50 per acre for materials, by means of a spray consisting of an emulsion of highly refined white mineral oil fortified with a small amount of either nicotine sulfate or derris extract. Such a spray is too expensive for use on corn grown for feed but is cheap enough for use on specialized crops, such as inbred or hybrid seed and market sweet corn. The spray is not recommended as a substitute for the creosote barrier but rather to kill any chinch bugs that may reach the corn, despite the barrier or before it is constructed. The oils used in these tests were highly refined water white mineral oils having an unsulfonatable residue of at least 96 percent and ranged in viscosity between 85 and 210 seconds Saybolt at 100° F. No difference in effectiveness was observed between the different oils used, owing to viscosit Since the lighter oils are cheaper they are recommended for this purpose. An emulsion was easily prepared by adding 1 gallon of oil to 1 pound of potash laundry soap dissolved in ½ gallon of hot water, and agitating until emulsification was complete. Ready-prepared emulsions were found effective but higher in cost. The cheapest mixture that gave satisfactory results contained 2 percen oil and 1/8 ounce of 40-percent nicotine sulfate, or derris extract containing 5 percent rotenone, per gallon. Oil emulsions of this type were found safe for use on corn 12 inches and more in height at much greater than the recommended strength. Occasional injury was observed on very small corn, especially when the spray was allowed to collect in the tops of the plants. Serious injury has been observed where commercial miscible or summer-spray oils were substitute for the mineral-oil emulsion. A man using a knapsack type sprayer can spray slightly less than 1 acre of corn in an 8-hour day.

JAPANESE BEETLE CONTROL

Open weather permits longer shipping season.--Mild weather during December permitted many nurseries in central and southern New Jersey to clean and obtain certification for dormant stock to be placed in storage for early spring shipment. Quantities of azaleas were treated with methyl bromide and paradichlorobenzene and were shipped under certification for forcing for the Easter trade. Certification of pansy plants indicates that an excellent market for these plants has opened up in the Southern States. Two central Jersey establishments found it difficult to keep up with their orders for pansies. Increasing demand for azaleas resulted in 1 New Jersey establishment equipping a separate building for treating plants. Controlled ventilation and adequate heating facilities were installed. Another establishment in the State is planning a special room for paradichlorobenzene treatments throughout the winter months. A series of electric heating cables will be evenly spaced on a concrete floor and covered with cinders. The treatment of the plants will be performed on the surface of the cinders. The temperature is not expected to vary more than 1° during the entire treatment. Another grower has decided to discontinue methyl bromide fumigation of azaleas, except those of the variety Hinodigiri. Treatment with paradichlorobenzene will be substituted. At another plant in the State 14 methyl bromide fumigations were made during the month, involving a total of 7,000 plants mostly azaleas. Shipments of dahlias to foreign ports still continues from Long Island, N. Y. Inquiries are also being received from foreign countries on these items. Two of the biggest growers in the Philadelphia area claim that in 1940 they experienced their best and largest shipping season in years. The largest pansy grower in this area claims that business during 1940 was the best he had ever had.

Nurserymen and greenhousemen found 1940 a good year.--During December a large Maryland grower of hydrangeas treated with methyl bromide 12,016 hydrangeas for shipment to nonquarantined States. Classified nurserymen in the vicinity of Washington, D. C., had a very good fall business. Judging from certificates issued, shipments of fruit trees from the Eastern Shore of Maryland, especially to North Carolina and South Carolina, are much heavier than usual.

New packing sheds to speed Japanese beetle certification work.--An eastern Maryland nursery engaged in the large-scale production of strawberry plants has just completed the erection of a packing shed to be used for the cleaning, washing, counting, and packing of strawberry plants. The shed is of frame construction with cement flooring. It has good light to facilitate the inspection operations and is equipped with a large heater. This building will enable the nursery to ship practically all of its strawberry plants directly from the farm where they are grown and will permit the nursery to get out its shipments irrespective of outside weather conditions. Owing to heavy receipt of orders for spring shipments, it is anticipated that under favorable weather conditions spring inspection work on the Eastern Shore of Maryland and Virginia will be very heavy. Another Maryland nursery has started the erection of a new and improved packing shed with facilities for grading, storing, treating, and washing plants and nursery stock. One room of this shed will be set aside exclusively for chemical-treating purposes. Present plans call for the installation of a new methyl bromide fumigation chamber larger than the one now in use. The new addition will be completed and ready for use before the spring shipping season opens.

Experimental fumigation of perennials continued.--Perennials representing 186 varieties were fumigated experimentally at the Division's district office at White Horse, N. J., on December 27. These plants had been donated by three New Jersey growers. The material was taken to Sanford, Fla., by government truck and arrived in good condition. Early observations of the growth made by these fumigated perennials will be made long before spring shipments are started in the North. Severely injured varieties will be omitted from commercial fumigations this spring. As was the case with the other two lots of plants taken to Florida during November, the plant-growing and injury check will be performed by members of the staff of the Division of Control Investigations.

All potting soil in a class III establishment to be treated for Japanese beetle.--A greenhouseman in the New York City area, who has been obliged to treat with carbon disulfide potted soil to be used in producing certified plants, has been so pleased with results that he has extended this practice to all potting soil used throughout both his certified and uncertified greenhouses. At this establishment 28 cubic yards of potting soil were recently fumigated under the supervision of an inspector. The owner claims that the soil is not only freed from all insect life but that the treatment apparently stimulates plant growth.

Grower to force azaleas to disprove alleged fumigation injury.--A grower in the New York City area had some potted azaleas returned because of alleged injury from fumigation with methyl bromide and treatment with paradichlorobenzene. These plants were checked in by an inspector for forcing in a certified greenhouse, as the shipper is convinced that the apparent injury is not due to the fumigation. The plants will be reshipped as soon as they bloom, as evidence that they would have responded to proper growing methods.

Seasonal gypsy moth certification activities.--Inspection and certification of evergreen boughs, the cutting of which was confined to the lightly infested area of southern Vermont and western Massachusetts, amounted to over 900 tons. Work was completed on December 23. Because of increased gypsy moth infestation it was necessary in some localities to abandon the method of bough-lot inspection and resort to actual piece-by-piece examination. Increased gypsy moth infestation in the lightly infested area of Vermont resulted in the finding of 7 gypsy moth egg clusters on Christmas trees inspected there during December. District inspectors engaged in routine inspection activities during December were responsible for the removal of 502 egg masses. Of this number, 240 were taken from forest products, nursery stock, and evergreen material inspected for immediate movement to nonregulated points. An additional 262 egg clusters were removed from materials inspected prior to their manufacture into novelties and subsequent shipment to outside points.

Elms killed by changing water level are heavily infested with bark beetles.--In a swamp area in New Milford Township, Litchfield County, Conn., a very heavy infestation of Hylurgopinus rufipes Eich. and Scolytus multistriatus Marsh. has been found in about 500 elms. It appears that the principal reason for the creation of this situation is the comparatively sudden change in water level caused by beavers constructing a dam in the swamp. Apparently this abundance of suitable beetle material resulted in such an increase in beetle population as to force beetles into living trees. There are now numerous trees with diameters of 4, 5, and 6 inches with dried foliage of this past season indicating that the trees were recently alive. These trees now show woodpecker injury from the base of the tree through every part of it to the 1-inch material. This extensive woodpecker work has resulted in a pile of bark approximately 2 inches deep accumulating at the base of the tree. The woodpeckers apparently attacked the thousands of beetles attempting to enter and prepare galleries in this living wood. In practically all cases only a contact with the wood was made. In numerous instances, however, galleries from $\frac{1}{4}$ to $\frac{1}{2}$ inch have been tunneled in the live wood.

Scouting for beetle material in Wilkes-Barre, Pa., area.--Systematic scouting for potential beetle material in the circle within a 5-mile radius of the center of Wilkes-Barre has been completed. Within a 2-mile circle all the elms have been top sampled for discoloration as well as inspected for beetle infestation or the presence of potential beetle wood. This coverage has been thorough and will be of material aid in controlling the disease in this district. Many elms have been tagged as Dutch elm disease suspects and many tagged as containing beetle wood. There have been no cases noted of Hylurgopinus infestation, and only a few instances where old galleries of this species have been observed. Of the numerous trees tagged as suspects in the 5-mile circle, eight of them have been confirmed as infected with the fungus causing the Dutch elm disease.

Permission required for Dutch elm disease scouting in restricted areas.--Before scouting may be performed in areas where firms are engaged in the manufacture of materials for National Defense, special permission must be obtained and arrangements made with the authorities concerned for entrance on their properties. By cooperating with the manufacturers, very little time is lost or additional work involved. Prior to the entrance of scout crews on United States Army reservations, it is necessary to contact the range officer. This is necessary as rifle and gun ranges are located at various points on the reservations and in some locations the danger of accidental shooting is great.

Bark-beetle observations in New York.--Exceptionally heavy beetle infestations were recently discovered in two swamp areas in Dutchess County, N. Y. The trees in both locations had died as a result of changing water level. One location is in the northeastern corner of the county, within approximately 1 mile of the Massachusetts line. The other is in the southern part of the county in the town of East Fishkill. At the time the first survey was made for beetle-infested material, the water was too deep to permit examination of the trees. Since the swamps have frozen over it has been found that a major portion of the trees are very heavily infested with both Hylurgopinus and Scolytus beetles. Inspection of dead and dying trees, as well as healthy trees, in the Binghamton, N. Y., area has shown literally thousands of adult H. rufipes hibernating in the outer bark of many elms. This condition is most common in areas where there is considerable old beetle wood. Trees of this type in the vicinity of Dutch elm disease locations will be removed as part of the sanitation program.

Factors in the development of bark-beetle infestations.--On the basis of field reports and general observations, it is believed that a high percentage of the current selective work on Dutch elm disease eradication, especially the pruning now under way, involves the removal of beetle material created by the heavy ice storm in March 1940. Some of the work in Connecticut can still be associated with the severe hurricane of September

1938. Considerable of the remainder of the work is the result of beaver dams or of road-building operations. Once an area is rid of dead and dying elms the development of beetle material would be almost negligible were it not for the above situations. Inasmuch as the extent, intensity, and time of such damage is unpredictable, it is frequently necessary to make drastic revisions in work plans and to introduce into the field work as much flexibility as possible.

Logging operations in Morris County, N. J.--During scouting in Morris County considerable beetle material was found that had resulted from logging operations. A logging firm had been operating in the area and had cut a number of large elms, using only the butt pieces, leaving the remainder scattered over the area. Upon inspection it was found that most of the wood on the ground was beetle-infested. An investigation is being made to determine the points to which the butt pieces have been shipped.

FOREST INSECT INVESTIGATIONS

Powder-post beetle damages stored apple wood.--Apple wood stored for fuel and home wood-working purposes in the basement of a residence at Burley, Idaho, was found by J. C. Evenden, of the Coeur d'Alene, Idaho, laboratory, to be severely infested with the southern lyctus (Lyctus planicollis Lec.). This infestation, which had reduced many of the larger sections to a mass of powder, is believed to have been in the material at the time of its storage. Although one could not be sure that the under side of the hardwood floors of the residence had not been attacked, no evidence of such injury was observed and it is thought that damage had been confined to the apple wood. It was recommended that this material be removed from the residence and destroyed.

Douglas fir beetle infestation in Cody Canyon greatly reduced.--According to D. A. Hester, of the Portland, Oreg., laboratory, the infestation of Dendroctonus pseudotsugae Hopk., which has been present for nearly 10 years in scenic Cody Canyon near the east entrance to Yellowstone National Park has at last yielded to control. Efforts at controlling this outbreak have been complicated by an outbreak of the spruce budworm (Archips fumiferana Clem.) running concurrently with that of the Douglas fir beetle. Defoliation by the budworm weakened the trees, causing them to be more susceptible to bark-beetle attack. With a decline in budworm population brought about by natural control factors and a consequent improvement in tree growth, it has been possible through direct control to reduce the Douglas fir beetle infestation to a point where control is no longer necessary. Current infestation on 12,000 acres, surveyed in the fall of 1940, is estimated at 400 trees, or approximately 21 trees per section.

Beetle-infested ponderosa pines salvaged.--Salvage logging operations on the Bear Valley pine beetle control project on the Malheur National Forest, Oreg., were begun during the second week of December, according to W. J. Buckhorn, of the Portland, Oreg., laboratory. The work is being done by a lumber company in cooperation with the Forest Service. In addition to salvaging beetle-infested trees, abandoned trees of high quality and a few green trees of very poor thrift are also being removed from the stand. This operation is being carried on in ponderosa pine stands selectively logged 3 years ago under a system whereby 40 percent of the volume was removed from the stand.

Low winter temperature field study continued.--J. M. Whiteside, Portland, reports that during the last three winters really low temperatures in Oregon and Washington--those lethal to overwintering western pine beetles (Dendroctonus brevicomis Lec.)--have been absent. However, in the hope that the law of averages will shortly apply and that the current winter will be a cold one, minimum recording thermometers have again been distributed over a wide area in the ponderosa pine region of eastern and central Oregon. These thermometers have been placed on many pine-beetle-survey plots in order to obtain a simple correlation between minimum forest-air temperatures and pine-beetle mortality and losses.

Direct-current voltage gradients an index to physiological condition of tree.--T. J. Parr, of the New Haven, Conn., laboratory, reports as follows concerning investigations on direct-current voltage gradients: "From the first of June, when the portable vacuum tube direct-current voltage gradient equipment was completed, readings were taken on a considerable number of trees at intervals of a few days up to October 24. In general, healthy conifers showed a higher gradient early in June than was the case at the end of the season, the trend being downward as growth activity became slower. There was a slight rise in gradient when secondary growth occurred. In normal trees in the spring and early summer the gradient in the cambial region was oriented with the top of the tree positive to the base. This condition became reversed in August. One physiological activity of the trees with which the reversal of gradient was correlated was that of fat storage in trees that were going into a winter condition. With the electrodes placed longitudinally on the trunks in the cambial region, and the distance between them standardized at 1 inch, there was little deviation in voltage gradient between individual trees. Where subnormal trees were concerned, conditions were entirely different. If the voltage gradient in the spring was oriented in the same direction as that in normal trees, it was much lower in magnitude and fell rapidly until it became oriented in the opposite direction, i.e., with the base positive to the top. The gradient on subnormal trees remained oriented in that direction until August, when it reversed again as the gradient in normal trees was reversing. Thus the gradient in subnormal trees was oppositely oriented to the gradient in normal trees over most of the year. Ordinarily, normal trees had approximately the same gradient on all sides. On an experimental plot near Alfred, Maine, readings were taken on white pines that had been exposed to full sunlight in sunscald experiments conducted by personnel of the Northeastern Forest Experiment Station. Gradients on the shaded side of the trees were normal, but on the exposed side were oriented in the opposite direction. Spruce trees in southern Vermont, which had been heavily defoliated by the European spruce sawfly, showed voltage gradients on September 26 and 27 which were, if not oppositely oriented, entirely different from those of undefoliated trees. Voltage gradients on less heavily defoliated trees approached the normal; that is, varied with degree of defoliation."

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Weather conditions hamper gypsy moth work.--The progress of gypsy moth work was generally satisfactory during December, although some rearrangement of plans was necessary in many sections because of frequent unfavorable weather conditions. Snowstorms rendered secondary roads temporarily impassable in many areas, and blocked wood roads used to transport the men as close as possible to the scenes of their labor. Sleet storms slowed transportation at times by coating the roads with ice, necessitated the withdrawal of workers from rugged elevations to relatively level country at lower elevations as a precaution against injury by falls, and hampered scouting operations by covering the trees with ice.

New brush-disposal machine ready for field tests.--The construction of a new brush-disposal machine has been completed at the gypsy moth storehouse in Greenfield, Mass. The new machine is generally similar to the machine which has been demonstrating the usefulness of this method of brush disposal in the field for a considerable period of time, but embodies several refinements, such as the lowering of the feeding mechanism in order that the brush can be more easily inserted. The new machine is now ready for field tests, after which it will be put into regular service. This type of brush-disposal work is especially valuable at locations where burning would injure living trees or where it is inadvisable for other reasons, and at all locations when ground conditions are such that the burning of the brush piles would be dangerous.

Scattered small gypsy moth infestations found in Vermont.--Several of the gypsy moth crews, which were withdrawn from the forests during the deer-hunting season in Vermont, were assigned to scouting work in the residential section of Rutland, Rutland County. These men found and destroyed numerous scattered egg clusters on fruit and shade trees. The distribution of the colonies indicated that the primary cause of the infestation was the wind spread of small caterpillars from other infestations. Rutland has been free of the gypsy moth for several years, the last infestations recorded having been found during the fiscal year 1927. A gypsy moth infestation consisting of four egg clusters was discovered in a woodland block containing approximately 400 acres in Manchester, Bennington County. Two of the egg clusters were located comparatively close to each other on one side of the wood lot, while the other two clusters were about ½ mile distant. The western half of Manchester is mountainous, heavily wooded, and traversed only by a few scarcely discernible logging roads.

Gypsy moth colony in hawthorn brush difficult to clean up.--Three gypsy moth infestations were located, late in December, in Lanesboro Township, Berkshire County, Mass. One of the infestations centers in a thicket of wild scrub apple trees and hawthorns, all of which must be chopped out and burned. The workers handle the hawthorn brush with long-handled forks for protection against injury from the long sharp thorns, the points of which are brittle, frequently break off after penetrating the flesh, and are painful to remove.

Small infestations found on Mount Greylock.--A crew of gypsy moth scouts working on the west slope of Mount Greylock, which lies partly in New Ashford Township, Berkshire County, Mass., recently located several small infestations of widely scattered egg clusters, all of which were immediately destroyed by creosoting. The lower slopes of Mount Greylock are heavily wooded and support a substantial percentage of trees favored as food by the gypsy moth. Considerable thinning and cleaning work is necessary in the vicinity of gypsy moth infestations in this region.

Birch logs inspected before movement to mills.--A crew detailed to conduct special scouting work in a white birch timber lot through which the New York-Massachusetts State line passes, in the vicinity of Williamstown, Berkshire County, Mass., found and destroyed several gypsy moth egg clusters. Logs cut from this wood lot are transported over the road to woodworking mills in Berlin, N. Y., and Bennington, Vt.

Wood lots examined before movement of Christmas greenery.--Early in December large quantities of Christmas trees and greenery began to move daily from various points in the Massachusetts section of the barrier zone. The points of origin of practically all of this material had been examined earlier in the season to insure against the transportation of gypsy moth egg clusters.

Gypsy moth work in Connecticut.--Scouting work was recently completed in several areas in Connecticut, which were found to be infested by the gypsy moth last year and which received treatment work, including spraying. The absence of new egg clusters at the sites of these old infestations is indicative of the thorough work done last year. A small infestation was found in the northern part of Canaan Township, and a small number of scattered egg clusters were found and creosoted in a heavily wooded section in the northeastern corner of the adjoining town of Salisbury. Four small infestations were discovered in Washington Township, none of them near any of the infestations discovered and treated last year. All three of the above towns are in Litchfield County. Chopping work continued at infested locations, and ideal burning conditions permitted the destruction of considerable quantities of accumulated brush and waste wood. The recent shifting of livestock from pastures to winter quarters removed the necessity of fencing the sections where gypsy moth spraying work was done last season, and a large amount of government-owned barbwire was removed during December. This work was completed late in the month in the northwestern section of Litchfield County and is progressing rapidly in other sections.

Late Christmas-tree inspection in Connecticut.--It was necessary to continue the examination of Christmas trees cut from a spruce plantation in Litchfield Township, Litchfield County, Conn., until the morning of December 24. Although most of the trees were cut for local use, the presence of gypsy moth infestations in nearby wood lots made it advisable to inspect all of the trees removed so there would be no possibility of transporting gypsy moth egg clusters to uninfested areas. No egg clusters were found on the trees inspected.

Few gypsy moth infestations found in residential sections of Pennsylvania.--All gypsy moth workers were transferred from wooded areas in Pennsylvania during the deer-hunting season, which comprised the first 2 weeks in December, in order to avoid the possibility of injury by stray bullets. An unusually large number of hunters were in the woods this year, and State game wardens estimated that no fewer than 1,000 cars were parked along a 10-mile stretch of road traversing a heavily wooded section in the mountains east of Wilkes-Barre where gypsy moth work is ordinarily conducted. The men were assigned to scouting residential and open sections and to burning brush during the danger period. The results of the residential scouting indicate that many gypsy moth infestations have been eliminated from sections of Luzerne and Lackawanna Counties that were formerly heavily infested and where intensive extermination work has been conducted annually since the gypsy moth was first discovered in Pennsylvania. A few small infestations were found in the residential sections of Kingston and Wilkes-Barre, Luzerne County.

Report of C. C. C. gypsy moth work for first half of fiscal year 1941.--There was a substantial increase in the amount of time used by the C. C. C. on gypsy moth work east of the barrier zone during the first half of the present fiscal year, as compared with the similar period of the fiscal year 1940. Approximately 36,000 6-hour man-days were used in the 1941 period, while only about 25,000 man-days were available in the corresponding period in 1940. This large increase was due to the return to gypsy moth work of crews that had been engaged in fire-hazard-reduction work since the hurricane of 1938. Work was performed on a total of 30,707 acres; however, it was necessary to cover 669 of these acres twice as additional treatment work was necessary, leaving a net total of 30,038 acres treated. Gypsy moth thinning work was done on 1,162 acres of woodland, and sprouts of favorable gypsy moth food plants were removed from an additional 1,517 acres that had previously been thinned in order that gypsy moth resistant sprouts would have a better opportunity to develop. All of this work resulted in the destruction of 135,819 new gypsy moth egg clusters. Seasonal burlapping work, begun toward the end of the fiscal year 1940 and extended into the 1941 fiscal year, resulted in the destruction of 294,435 additional gypsy moth caterpillars and pupae. Spraying work, which was also done in parts of the two fiscal years, resulted in the coverage of 2,816 acres.

C. C. C. gypsy moth work reduced during December.--A total of 4,650 6-hour man-days were used on C. C. C. gypsy moth work during December. From 1,400 to 1,533 man-days per week were used during the first part of the month, but the time dropped to a low of 193 man-days used during the week ended December 28. This extreme reduction was due to storms, to two holidays during the week, and to the ending of an enrollment period. The amount of work accomplished each week was less than had been anticipated, as the quotas of the camps were considerably below the maximum during the entire period. While C. C. C. gypsy moth work consisted principally of selective thinning work during the first 4 months of the present fiscal year, more emphasis has been placed on scouting work since the dropping of the foliage in order to determine infestation conditions and to locate the sites of heaviest infestation so that further thinning and intensive work can be done at the most advantageous locations. It was necessary to interrupt the scouting work for short periods during the deer-hunting seasons and also on days when conditions were unfavorable for scouting, and to assign the men to thinning and burning operations.

Economy stressed in C. C. C. gypsy moth work.--Gypsy moth foremen have been instructed to conduct the thinning work as economically as possible, consistent with obtaining the desired results. One method of reducing the cost of operations is to scatter the cut brush so that it will rot and disintegrate rather than to assemble and burn the debris. The use of this method where conditions are favorable has resulted in a gradual reduction in the cost per acre and has permitted the treatment of a larger acreage with the man-power available. This type of work has been considerably more costly in Vermont than in Massachusetts and Connecticut, as large areas in Vermont have not been cleaned up since the hurricane and are covered with a tangle of blown-down trees which must be treated.

Infestation conditions east of barrier zone.--C. C. C. gypsy moth scouting work east of the barrier zone in Massachusetts and Connecticut indicates that the egg depositions are not as heavy as they have been during the last few years, but that a generally scattered infestation is present. The situation is different in certain parts of Vermont, where very heavy infestations have been found in Westminster, Rockingham, and Springfield, and scattered but annually increasing colonies exist in the towns of Chester, Ludlow, Grafton, and Plymouth.

Property owners apply approved gypsy moth methods to woodlands.--Property owners are showing an increasing interest in C. C. C. gypsy moth work. Many of them have consulted C. C. C. gypsy moth foremen regarding proper methods for treating their properties, and have treated their woodland blocks in accordance with good gypsy moth practice. Some have followed up their thinning and cleaning work with the planting of species of trees resistant to gypsy moth. Similar cooperation has also been found in the treatment of some public lands. The superintendent of a large water board property in Massachusetts has agreed to follow the C. C. C. thinning work with the removal of large white oaks, thereby improving the work and sharing in the cost. Such cooperation results in improvements in the stands of the property owners and is of great assistance to the gypsy moth work as a whole.

PLANT DISEASE CONTROL

Barberry bushes destroyed on 31 properties in Ohio in December.--Crews working in Ashtabula, Champaign, Columbiana, Fulton, Lorain, and Muskingum Counties covered areas totaling 115 square miles during the month, and 608 barberry bushes were destroyed on 31 properties, 10 of which were new locations. The crews assigned to Fulton County conducted some resurvey in adjoining townships in Henry County, and 145 barberry bushes were found and destroyed on 6 of 127 old properties visited. Henry County was given an intensive survey in 1936 and no clean-up work has been done since. The results of this resurvey, therefore, indicate that substantial progress has been made toward putting this county on a maintenance basis.

Eleven million barberry bushes destroyed in Pennsylvania since 1935.--In 1939 Pennsylvania produced more than 50 million bushels of wheat, oats, barley, and rye. The State ranks about ninth in the production of winter wheat, with an average yield of 21 bushels per acre. Prior to 1935 repeated crop failures resulting from black stem rust had forced many farmers to abandon the growing of small grain crops in localities heavily infested with barberry bushes. Farm operators were compelled to buy feed which ordinarily would have been produced on their own farms, were it not for the rust hazard. Since 1935 more than 11 million barberry bushes have been destroyed on 7,500 different properties distributed throughout 17 counties. It is estimated that initial control work has been accomplished in areas totaling approximately 17 percent of the State.

Benefits from control work in Pennsylvania.--Since completing the initial survey in Lackawanna and Susquehanna Counties in 1935 and 1936, there has been an increase in the production of small grains in these counties amounting to 30.7 and 33.3 percent, respectively. Similar increases in production are recorded in other counties where barberry bushes have been removed, while in counties where no control work has been done there was no appreciable increase in either acreage or production. Based on 5 years of observations, L. K. Wright, in charge of control work in Pennsylvania, estimates that losses from stem rust in that State have been reduced by 90 percent where barberry bushes were eliminated. Grain growers are advised, however, that their crops will escape damage from rust only if surrounding woods and fence rows are kept free from barberry bushes. In many communities organized groups of farmers are making annual inspections of their own farms and destroying bushes that develop from seed. There are, however, extensive wooded areas where one or more systematic resurveys will be needed before maintenance work can be turned over to local groups.

Scanty Ribes regeneration around white pine shelterbelts in Iowa.--In Blackhawk County, Iowa, *Ribes* eradication was performed in 1940 for the second time around 45 shelterbelts initially worked in 1934. An interesting and encouraging comparison in numbers of *Ribes* pulled in each of these workings, 6 years apart, follows:

Working	Ribes per area		Ribes destroyed		Total bushes found	
	Wild	Cultivated	Wild	Cultivated	Wild	Cultivated
	Number	Number	Number	Number	Percent	Percent
Initial, 1934---	452.4	12.5	20,356	563	--	--
Second, 1940----	41.6	0.4	1,874	17	8.4	2.9

An "area" in this table relates to a single shelterbelt and the protective zone of about 80 acres surrounding it. The wild *Ribes* pulled were almost entirely *Ribes missouriense* growing in and near shelterbelts. Red currants and gooseberries made up the cultivated *Ribes* destroyed. Labor in 1934 was employed on N. R. A. funds, and in 1940 on W. P. A. funds under an efficient foreman. It will be noted that in 1940 the proportion of total bushes found was only 8.4 percent for wild *Ribes* and 2.9 percent for cultivated *Ribes*. These findings are most encouraging as an indication of the effectiveness of eradicative measures in suppressing *Ribes*. It is equally encouraging to analyze the number of jobs from the standpoint of the presence or absence of *Ribes* at each eradication, as follows: (1) Wild *Ribes* *present* first eradication, *present* second eradication, 22 jobs; *present* first eradication, *absent* second eradication, 11 jobs; *absent* first eradication, *present* second eradication, 7 jobs; *absent* first eradication, *absent* second eradication, 5 jobs; total, 45 jobs. (2) Cultivated *Ribes* *present* first eradication, *present* second eradication, no jobs; *present* first eradication, *absent* second eradication, 22 jobs; *absent* first eradication, *present*

second eradication, 5 jobs; absent first eradication, absent second eradication, 18 jobs; total, 45 jobs. It appears from this record that one-third of the 33 areas on which wild Ribes were found in 1934 were successfully and completely freed from them at that time, but that Ribes were either overlooked on 7 of the 12 areas reported as Ribes-free in 1934 or have since developed there from seed brought in by birds. Considering cultivated Ribes, none of the 22 areas where bushes were found and destroyed in 1934 showed any Ribes in 1940. This is largely due to the low regenerative ability of cultivated bushes. On 5 of the areas cultivated bushes had either been planted between 1934 and 1940, or the workers overlooked them in 1934. On a fairly substantial basis of 45 areas, all of these data show decidedly encouraging results in the establishment of control around Iowa shelterbelts.

Cultivated Ribes in Tennessee.--R. D. Tanksley, in charge of blister rust control work in Tennessee, reports that 255,622 cultivated Ribes were removed from 1,601 locations during the period 1934 to 1940, inclusive, and that 17,116 cultivated bushes are still growing at 991 locations. Of 20 counties known to be growing white pine, cultivated bushes have been discovered in 13 counties. The total number of recorded cultivated Ribes in the State, including those destroyed and those still living, amounts to 272,738 bushes. Of this number, over 93 percent already have been destroyed. The work in Tennessee has been based on education and persuasion, rather than on law enforcement.

Spread of white pine blister rust in 1940, summary.--During the calendar year 1940, blister rust was found for the first time on either white pine or Ribes in 16 counties of the Eastern States and 1 county in the West. Ten of these counties are in the North Central region, 6 in the Southern Appalachian region, and 1 in the sugar pine region. In 2 counties, namely, Jackson County, Mich., and Hampshire County, W. Va., infection was found for the first time on both Ribes and pine; while, of the remaining 15 counties, infection was found on Ribes in 9 counties, and on pine in 6 counties. The rust is generally distributed throughout the Northeastern States on both host plants and in many sections damage to large pines is becoming increasingly noticeable in unprotected areas. Observations show that the disease continues to spread unchecked in areas where Ribes are present and that effective control has been accomplished on those tracts from which these bushes have been removed. In the western white pine region of eastern Washington, northern Idaho, and western Montana, the known infected area remains the same as at the end of the calendar year 1939. With pine infection scattered over all of the white pine belt of the Inland Empire, infection may be found on Ribes each year in all parts of this area where these bushes occur in any number. Consequently, the rust is intensifying to some extent in those parts of the white pine type from which the Ribes have not yet been removed, and at a greatly increased rate in those unprotected drainages where the disease has been present for several years, particularly in the younger stands. Scouting on the Gallatin National Forest at a point 19 miles from Yellowstone National Park, where Ribes infection was found in 1937, revealed negative results on both the Ribes and the limber pines. Additional scouting in and adjacent to both Yellowstone and Grand Teton National Parks also failed to show any evidence of blister rust. In the sugar pine region an important development in the spread of the rust was the discovery of 2 infected sugar pines in California, along Bailey Creek near Viola (Shasta County), on the Lassen National Forest in the general vicinity of Ribes infections found there in 1938. This infection places the known southern limits of pine infection in California about 107 miles south of the Oregon border and is the first record on pine in Shasta County. Scouting in the Shasta and Klamath National Forests in California from late in August through September was directed primarily toward determining the extent to which infection had become established on pines as a result of previous years' spread of the rust to Ribes, especially from the wave of Ribes infection which blanketed the Klamath National Forest and extended more lightly over the Shasta National Forest in 1937. Results on the Shasta National Forest were negative. Over the moister regions of the Klamath National Forest, however, it was found that a widespread return of infection to sugar pines which were situated near Ribes that were infected in 1937 had taken place. The negative results obtained in scouting for the rust on Ribes in California in 1940 indicates that this year, like last, was unfavorable for long-distance spread of the rust from the pine infection centers in the north to Ribes in that State.

Ribes eradication 20 years ago still controls blister rust.--N. H. Harpp reports that Ribes were destroyed on several thousand acres of forest land in Warren County, N. Y., in 1918 and 1919 in the towns of Caldwell and Chester. When compared with unworked areas in the same localities, the effectiveness of the early Ribes-eradication work is readily apparent. In the town of Caldwell, situated along Lake George between Lake George Village and Bolton landing, many acres of white pine are practically free from rust infection, except for very old cankers. In the town of Chester, near Chestertown and Loon Lake, the area on the east side of Highway No. 9, which was worked in 1918, shows little or no infection, while on the west side of this highway in the vicinity of Igerna, where no Ribes-eradication work was done prior to 1936, infection on pine is very heavy. A 1-acre plot was examined in this unprotected section in October 1940, and it showed that 40 percent of all trees over 6 inches in diameter breastheight were dead or will die from stem cankers established before 1936. During the fall of 1940 a study of 26 unprotected plots in Warren and Essex Counties, N. Y., showed infection ranging from 30 to 70 percent. All diseased trees inspected were 6 inches d.b.h. or larger and had stem cankers. No Ribes eradication was done on any of the areas on which these plots were located in the early years of the control program. On those that have been worked in recent years, very little new infection has taken place. In the town of Lewis, Essex County, the Ribes were removed from about 400 acres in 1919, 1920, and 1921. In different locations on these areas, the trees with old cankers originating in 1919 or earlier range from 30 to 45 percent. In the town of Elizabethtown, Essex County, 100 acres were worked in 1924, and here in places 70 percent of the pines show infection that took place before Ribes eradication, while very little infection originating since 1924 can be found. On and near the areas which were worked some years ago prolific white pine reproduction practically free from infection is very noticeable. The destruction of some 12,000,000 Ribes in Warren and Essex Counties since the beginning of control work has brought about this marked improvement over early rust infection conditions.

COTTON INSECT INVESTIGATIONS

Early freezes cause high mortality of pink bollworm.--A. J. Chapman, of the Presidio, Tex., laboratory, reports that the first freezing temperatures in the Big Bend caused a high mortality of pink bollworms in green bolls. Temperatures of 30°, 24°, 24°, 29°, and 33° F. were recorded for November 14, 15, 16, 17, and 18, respectively. At the beginning of the cold spell cotton was growing. Examination on November 18 of 200 green bolls that had been killed by the freeze showed that of the 273 pink bollworms found in this environment, 11 were alive and 262 were dead, or a mortality of 95.97 percent caused by the cold weather. The pink bollworms in the succulent bolls were the only ones affected by the low temperatures, as no mortality was found to occur among larvae in open bolls, in cocoons in surface trash, or in the soil. According to the last several years' records, overwintering larvae in the last three environments would not be affected by the temperatures listed above.

Small and large boll weevil control plots compared.--During 1940 boll weevils caused serious damage in the Waco, Tex., area. Studies conducted by K. P. Ewing and associates in fields and large plots showed considerable gains in yield of dusted over undusted cotton, whereas in the small plots differences between cotton yields from treated and untreated plots were much less marked. Control experiments were conducted on 36 plots of 1/18 acre each, in a compact 2-acre area within a 27-acre field. The cotton within the experimental area and throughout the entire field was unusually uniform and, exclusive of the fact of boll weevil control, it was believed that the potential production was practically the same in any part of the field. Large plots of 1 acre or more were used in control experiments in 5 other fields in the Waco area.

Plots	Yield of dusted cotton	Yield of undusted cotton
	Pounds	Pounds
Small	1,445	1,336
General yield, (same field as above)	--	582
Large (average, 5 other fields)	840	382

It will be observed that untreated small plots yielded much nearer the level of treated cotton than did large plots or fields. While some of this apparent gain may be due to random variation or insecticidal action of drifted dust, it is believed that most of it is due to decrease of weevil population in the compact plot area. Thomas and Reinhard (Tex. Bul. 475, 1933) have shown that weevils are very migratory, and it is probable that many weevils from the small check plots get into dusted plots and are killed. Infestation records in general agree with yield records and support this belief. In the check plots within the 2-acre experimental area the peak infestation was 32.1 percent, while the peak infestation in the rest of the field reached 90 percent.

Effects of calcium arsenate on reproduction of cotton aphid.--The effects of calcium arsenate on the reproduction of the cotton aphid was studied by E. W. Dunnam and J. C. Clark at Stoneville, Miss. Plots of the same variety of cotton were dusted during the period July 18 to August 19 with 9 applications of 8 pounds per acre of calcium arsenate containing 13.9 percent and 0.7 percent water-soluble arsenic, respectively, by the Geneva method. Colonies of aphids occurring naturally on the plots receiving the high and low water-soluble calcium arsenate and the untreated checks were encaged in organdy bags and left undisturbed for 12 days to note the reproduction. Sixty-one aphids in 5 colonies were used for each treatment. One series of each treatment was started before the date of the last application of calcium arsenate, 1 series was started 10 days after the last application, and 1 series 20 days after the last application. In each series the rate of reproduction was higher on the plants dusted with high water-soluble calcium arsenate than on the plants dusted with the low water-soluble calcium arsenate or the checks. The number of young produced in the 3 series were 1,620, 1,367, and 1,029, respectively, on the plants dusted with high water-soluble, low water-soluble, calcium arsenate , and untreated. Another series of tests was started on September 18, or 30 days after dusting was discontinued, by placing 10 newly born aphids in individual organdy bags on the fourth leaf from the tops of plants receiving the different treatments. In another plot dusted with the low water-soluble calcium arsenate, all of the fruiting forms were removed at weekly intervals through August 12 and newly born aphids were caged individually as above. In all tests the young aphids were removed daily after reproduction started. The average reproduction and longevity is shown in the following table. All squares were removed through August 12.

Calcium arsenate	Average days prereproductive period	Aphids born in 12 days	Total aphids born in 40 days	Average longevity of aphids
	Number	Number	Number	Days
High As_2O_5---	4.2	96	232	25.3
Low As_2O_5 ----	5.2	80	320	32.6
None-----------	6.9	40	127	22.6
Low As_2O_5------	5.7	74	143	20.5
None-----------	6.8	68	201	25.1

On the normal plants, where the squares were not removed, the average prereproductive period was shorter and reproduction was faster during the first week on the plants dusted with calcium arsenate containing high water-soluble arsenic than on those dusted with low water-soluble calcium arsenate, or on the checks. After the first week there was little difference in the rate, but reproduction continued longer and the total number of young was greater on the plants dusted with low water-soluble calcium arsenate than on the high water-soluble calcium arsenate or the checks. The average longevity was also greater. On the plants where squares were removed the prereproductive period was ½ day longer on the plants dusted with low water-soluble calcium arsenate than on plants receiving similar treatment with the squares not removed. However, on plants where the squares had been removed, the total reproduction and longevity was greater in the checks than on the plants dusted with low water-soluble calcium arsenate, which is a reversal of conditions on the normal plants. The prereproductive period in the untreated checks was practically the same for the two series, but in both cases was longer than where calcium arsenate had been applied. With the influence of parasites and predators eliminated by the organdy bags, these data offer strong evidence that nine applications of calcium arsenate affected the food value of the cell sap and accelerated aphid maturity and reproduction.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Inspection.--Gin-trash inspection of the 1940 cotton crop was concluded about December 15. At the time inspection was terminated machines were operating in the Arizona district and in Mexico at Mexicali, Baja California. For the season a total of 136 pink bollworms were found in Maricopa County, Ariz., most of these coming from the Glendale area, where infestation existed last year. None were found in the Gilbert area, which was infested last season. Two specimens were found at Coolidge, in Pinal County, the same number found in that county last year. Large volumes of trash were inspected in the cotton-growing areas of Pima County, with negative results for the season. Last season 2 specimens of the pink bollworm were found in that county. During December, 3 Thurberia weevils were taken through the inspection of gin trash in Pima County. Results of all inspection in the Mexicali area of Mexico were negative. Field inspection of cotton forms found on random plants in the lower Rio Grande Valley district, incidental to grubbing operations for the purpose of creating a host-free period during the fall and winter months, was continued throughout December. A total of 225 green bolls found and inspected during the period yielded 13 specimens of the pink bollworm, 12 of which came from Cameron County and 1 from Hidalgo County.

Destruction of sprout and volunteer cotton.--One of the principal control measures for the suppression of the pink bollworm in the lower Rio Grande Valley calls for the destruction of all live cotton plants immediately after the harvesting of the crop and not later than October 1, each season. However, on account of very favorable soil and climatic conditions in that region it is necessary to carry on during the fall and winter months an intensive campaign against developing sprout cotton in the fields and random plants growing in out-of-the-way places to prevent fruiting of these plants and the consequent build-up of infestation to attack the spring crop. The campaign for the creation of a host-free period in the lower valley area was continued during December, with 35 grubbing crews operating throughout the greater part of the period. Although this campaign has been prosecuted vigorously since the completion of the main stalk-destruction program, it is not believed that a complete host-free period was established until the latter part of December. Farmer cooperation in the accomplishment of a host-free condition has been very satisfactory, and it is believed that there was less fruiting cotton after October 1 this season than at any other comparative period since control measures have been in effect in that area.

Field clean-up in Presidio area of Big Bend.--Since a special control program was put into effect in the Presidio area of the Big Bend of Texas in the fall of 1938 the heavy pink bollworm damage to the cotton crop in that area has been reduced to a negligible degree. One of the principal control measures followed in that area calls for the cutting, piling, and burning of stalks immediately after the cotton crop is picked out. Clean-up for the present season got well under way around December 1, and was nearing completion at the end of the month. During the last two seasons it has been necessary to resort to hand-picking of cotton debris in many of the heavily infested fields in an effort to further reduce the winter carryover but, owing to the present light infestation, it has been necessary to hand-pick only a comparatively few fields this season. Through the cooperation of the Cotton Insects Division, fields have been located showing sufficient surface and soil population to justify winter cultural practices, consisting of plowing followed by irrigation. With the incentive of further reducing the pink bollworm infestation for the 1941 crop, all farmers have evinced considerable interest in such cultural practices, and at the end of December plowing and irrigation were under way in a number of fields where the degree of infestation warranted such measures, and plans were being made by other farmers to start such work. Other control measures for this section restrain farmers from planting cotton prior to April 20, and no sprout cotton is allowed to fruit prior to the fruiting of the spring crop. The manipulation of the planting date in relation to spring moth emergence results in most of the overwintering pink bollworms emerging as moths in the spring and dying before the cotton comes into fruit. The effects of the complete control program for the pink bollworm carried out on both sides of the river were reflected in cotton production. Production of cotton in Presidio County in 1938 was 622 bales; in 1939, 1,466 bales; and in 1940, 1,948 bales. The greater part of this increase in production is undoubtedly due to the control of the pink bollworm; however, some 200 or 300 bales were destroyed in 1938 by a flood.

Control measures in lower end of Juarez Valley, Mexico.--The Mexican and United States Departments of Agriculture make inspections annually on both sides of the boundary. There is a place in Mexico in the vicinity of Vado de Cedillas considered as part of the Juarez Valley, but which is really the upper end of the Big Bend area, and its climatic conditions more nearly resemble those prevailing in the Big Bend. On account of the isolation of this area, and its being attached to the Juarez Valley district, the control measures heretofore applied in the Big Bend area were not applied; consequently, the pink bollworm increased here enormously. One sample of trash from seed cotton originating in that locality revealed a total of some 10,000 pink bollworms in the fall of 1940. The control program of the Big Bend is being carried out here. By the end of December it was estimated that 75 percent of the fields had been cleaned and plowing was well under way. The delay in planting will be carried into effect in that region for the year 1941; therefore, we can expect a substantial reduction in the infestation in this area in 1941.

Wild-cotton eradication.--For years efforts have been under way to eradicate the pink bollworm from southern Florida and adjacent keys by destroying one of its principal hosts, the wild-cotton plant. This action was considered necessary when it was found that the pink bollworm was spreading from this area northward to domestic cotton plantings. From the beginning of the present season up to the middle of December, W. P. A. crews have handled all of the wild-cotton-eradication work, except that being done by 2 Bureau crews operating from house boats. At the beginning of December the W. P. A. quota of 90 workers was increased to 102. As a result of previous arrangements made by this Department with Army and Forest Service officials, a C. C. C. Camp was established at Cape Sable during the first half of December to aid the Bureau in the eradication of wild-cotton plants from that region. Enrollees of this camp, approximately 180, reported for duty with this Bureau around December 16. At the end of the period the Bureau W. P. A. and C. C. C. work had become well coordinated, and good progress was being made in all areas. During the month a total of 4,261 acres was recleaned, from which were removed 3,267 plants with mature bolls, 166,332 seedlings, and 289 sprout plants.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Tests of hornworm insecticides.--An experiment conducted by L. B. Scott and Joe Milam, of the Clarksville, Tenn., laboratory, during the summer of 1940 on replicated small plots of dark fire-cured tobacco showed that cryolite was more effective against larvae of the hornworms Protoparce sexta (Johan.) and P. quinquemaculata (Haw.) than was paris green at the dilutions and rates of application compared. Following are the results obtained.

Treatment	Application rate per acre	Reduction in-- 48 hours	72 hours
Spray mixture:		Percent	Percent
Cryolite and water (6 lb.-50 gal.)	70 gal.	84	93
Dusts:			
Cryolite undiluted	20 lb.	63	81
Paris green and hydrated lime (1½ lb.-5½ lb.)	7 lb.	48	48
Untreated	---	-11	-23

The data show that the cryolite spray was considerably more effective than the cryolite dust and that both were more effective than the paris green-lime dust mixture at the rates of application used. Each treatment was replicated on 4 plots of tobacco containing 100 plants each, the 16 plots being arranged in a Latin square. Application of the spray was by a knapsack sprayer, while that of the dusts was by a rotary hand-operated duster. The effectiveness of the treatments was determined by counting all larvae found on 20 plants per plot before application and at 48 and 72 hours after. The cryolite used in these tests contained 85 percent sodium aluminum fluoride.

Effectiveness of mole cricket bait.--Intensive experiments conducted by C. B. Wisecup and A. H. Madden during the fall of 1940 near Plant City, Fla., showed that a calcium arsenate-bran bait was effective against mole crickets under field conditions when applied at the rate of 30 pounds dry weight per acre, that the addition of molasses to this bait did not increase its effectiveness, and that the bait can be stored for 1 month without a loss of effectiveness. The species involved was chiefly Scapteriscus vicinus Scudd., although S. acletus R. & H. and Gryllotalpa hexadactyla Perty were also present. There was no appreciable difference in the amount of surface burrowing by the mole crickets in plots treated with 30, 50, and 70 pounds per acre of the bait, but there was more burrowing when only 10 pounds of bait was applied. For the 30-pound application an average of 90 percent reduction in the surface disturbed by mole cricket burrows was recorded 2 weeks after the bait was first applied; however, on 3 of the 5 plots treated at this rate, a second application was made 1 week after the first. The addition of molasses caused a significant reduction in the efficiency of the bait when the combined results from the 4 rates of application were compared. The reduction in surface area burrowed by mole crickets ranged from 75 to 83 percent 1 week following a single application at the 30-pound rate for bait mixtures that had been prepared and stored for periods of 1, 2, 3, and 4 weeks prior to application. There was no significant difference among these and one freshly mixed at the time of application, although during storage the temperature in some of the mixtures rose to 126° F. The standard bait mixture employed in these experiments consisted of 7½ pounds of calcium arsenate and 100 pounds of mill-run wheat bran, slightly moistened with water prior to application. When molasses was included the bait was moistened with a mixture consisting of 1 part of molasses to 6 parts of water. The treatments were replicated from 4 to 20 times in randomized block arrangement of plots on representative farms. Each plot was 10 by 30 feet in size, surrounded by a vertical metal barrier extending 6 inches into the soil and projecting 2 inches above. The effectiveness of treatments was determined by counting the numbers of square inches of soil disturbed by mole crickets in each of 20 random areas of 100 square inches per plot before and at intervals after application. In order to stimulate surface activity and thereby to obtain a better index of the mole cricket populations, the plots were sprinkled with water a day or more prior to each examination, because these experiments were conducted during an unusually dry period. These studies were conducted in cooperation with the Division of Domestic Plant Quarantines, in connection with the widespread bait operations being carried out against mole crickets by that Division.

Seasonal variation in percentage of infective aster leafhoppers.--From a series of tests conducted by F. F. Smith, of the Beltsville, Md., laboratory, during the period May to September 1940, inclusive, it was found that of the aster leafhoppers (*Macrosteles divisus* Uhler), which transmits the "yellows" infection to aster plants, very few were infective in the field, and there was a considerable seasonal variation in the percentage of infective leafhoppers. From a total of 761 adult leafhoppers tested during the entire period, only 20 were found to be infective. The percentages of infective leafhoppers from collections made during May, June, July, August, and September were found to be 0.4, 1.0, 5.2, and 5.4, respectively. In conducting these tests, individual leafhoppers were isolated on aster seedlings to determine their ability to cause yellows infection at the time of collection. The samples of leafhoppers from which the individuals used in these tests were drawn were taken from collections made on lettuce and China asters.

Toxicity of insecticides against Say's stinkbug.--An intensive series of small-scale toxicity tests against *Chlorochroa sayi* Stal, an important pest of sugar beets grown for seed in the Mesilla Vally of New Mexico and in southern Arizona, has recently been conducted by O. A. Hills, V. E. Romney, and K. B. McKinney, of the Phoenix, Ariz., laboratory. In these tests a large number of insecticides were used as sprays and dusts. The results showed that dust mixtures containing from 1 to 4 percent of dinitro-o-cyclohexylphenol effected high mortalities of the test insects but caused severe foliage burn when applied to sugar beets. There is some possibility, however, that a dust mixture can be prepared which will contain a sufficient quantity of this ingredient to be effective and will not cause foliage injury to the beets. Impregnated pyrethrum dust diluted so as to contain from about 0.2 to 0.3 percent total pyrethrins was the most effective insecticide tested. Corroborating field observations made during the summer of 1940, which showed that impregnated pyrethrum dust mixtures varied considerably in effectiveness against this stinkbug, the laboratory tests showed that careful grinding and mixing of the stock impregnated dust with some of the diluent was necessary to prepare a homogeneous dust mixture. Unless the mixing was thorough, small pellets of the impregnated dust occurred in the finished dust mixture, resulting in too great dilution. Dusts impregnated with derris extract, even at excessive strengths, gave unsatisfactory mortality of the test insects. A dust mixture consisting of impregnated pyrethrum dust and a diluent proved to be more effective than the same mixture which had also been impregnated with derris extract. In general, less effective results were obtained from the application of spray mixtures than dust mixtures of the insecticides compared. In conducting these tests quantities of the insecticides as nearly equal as possible were applied by means of hand sprayers or dusters to the test insects through the walls of small cylindrical screen-wire cages, which also contained branches of green plants for food, extending beneath into a separate container filled with water. After application the cages were retained in the laboratory and periodic examinations were made to determine the rate and amount of mortality resulting among the treated insects. In most instances each treatment was applied to 6 cages containing 10 insects each.

Fumigation detrimental to parasites and predators of stored-tobacco insects.--C. O. Bare, of the Richmond, Va., laboratory, reports the results of tests to determine the fate of parasites and predators of the cigarette beetle (*Lasioderma serricorne* (F.)) and the tobacco moth (*Ephestia elutella* (Hbn.)), subjected to fumigation in open storage warehouses that had been sealed prior to treatment. The results of these tests indicated that the hymenopterous parasite *Aplastomorpha calandrae* (Howard) and the mites *Seiulus* spp. and *Monieziella* (?) *augusta* Banks were easily killed by atmospheric fumigation with hydrocyanic-acid gas applied at the rate of 12 ounces per 1,000 cubic feet in an open storage warehouse sealed with balloon cloth, when the test specimens were suspended in open-air spaces. However, the *Monieziella* mites at a depth of 5¼ inches in bales of tobacco withstood the fumigation. Previous experiments had indicated that the hymenopterous parasites *Mesostenus gracilis* (Cress.), *Microbracon hebitor* (Say), and *A. calandrae* are easily killed under similar conditions from the application of hydrocyanic-acid gas at the rate of 6 ounces per 1,000 cubic feet. In these tests the test specimens were suspended in open containers at each of three levels in the fumigated warehouse--near the ceiling, near the floor, and midway between. By use of testspikes the two species of mites were also placed at various depths in bales of tobacco undergoing fumigation. After 50 hours of fumigation the mortality among test specimens was determined and compared with similar data from other lots exposed in warehouses that had not been fumigated.

INSECTS AFFECTING MAN AND ANIMALS

Design of micro-apparatus and technique.--William Robinson, Beltsville, Md., reports that in his search for the enzyme urease in various organs of individual screwworm larvae, his associate, C. S. Wilson, has designed micro-apparatus and technique so that determinations have been made from tissues ranging from 15.0 to 0.3 cubic millimeters in size. It is believed that this is the first time such minute amounts of material have been isolated and analyzed.

Breeding place of stablefly larvae.--In his report for the last quarter of 1940, W. E. Dove, Panama City, Fla., tells of the discovery of infestations of "dog fly" (Stomoxys calcitrans L.) larvae and pupae in peanut litter in the fields throughout the principal peanut-growing section of northwestern Florida, southeastern Alabama, and southwestern Georgia. The breeding occurred in fermenting waste, leaves, and stems left in the field where peanut vines were baled for hay. After fall rains the infestations were found in every pile of litter examined. The piles, about 25 x 30 feet, and ranging from 3 inches deep on the edge to 3 feet deep in the center, were found at the rate of about 1 to each 10 acres of harvested peanuts. In 10 counties of western Florida, 9 counties of southern Alabama, and 33 counties of southeastern Georgia it is estimated that 1,000,000 acres of peanuts were harvested in 1940, and that these resulted in about 100,000 piles of litter which are breeding, or are capable of breeding, outbreak numbers of dog flies in that area. Mr. Dove states that in favorite locations there may be more than 100 larvae and pupae per square foot of litter. Another and a different dog fly breeding problem exists in drifts of marine grasses washed ashore on beaches of bays and sounds. The latter breeding occurs in different areas and at times when one would expect the breeding in peanut litter to be at a low point. In general, the months of July, August, and September are the dangerous months for breeding of dog flies in marine grasses, whereas breeding occurs in the wet peanut litter a month or two later.

New compound toxic to mosquito larvae.--W. V. King and R. C. Bushland, of the Orlando, Fla., laboratory, have found a new compound which has shown outstanding toxicity to larvae of the southern house mosquito (Culex quinquefasciatus Say). In preliminary laboratory tests 1.0 p. p. m. of the compound killed about the same percentage of test larvae as did phenothiazine (in 48 hours) and seemed more toxic than 4-(p-bromophenylazo)-m-cresol. Mixtures of the new compound with phenothiazine and with 4-(p-bromophenylazo)-m-cresol were not as effective as equal dosages of the components. The tests indicated a minimum lethal concentration of about 1.5 p. p. m. of the new material for satisfactory kills.

Age of mosquito larvae and resistance to insecticides.--Mr. King also reports that tests on Culex larvae at ages of 2, 3, 4, and 6 days indicated that as the larvae mature they become more resistant to insecticides.

Ditching reduces breeding of salt-marsh mosquitoes.--G. H. Bradley and B. V. Travis, of the New Smyrna, Fla., laboratory, state that during 1940 ditching reduced mosquito-larval density 100 percent on Batis marshes, 99 percent on bunchgrass marshes, 99 percent on Juncus marshes, 75 percent on *Distichlis* marshes, and 67 percent on *Salicornia* marshes. Where *Salicornia* and *Batis* combined were dominant, a decreased larval population of only 63 percent occurred, whereas on areas where *Salicornia* and *Distichlis* combined made up the dominant flora, a decrease of only 23 percent was observed. Messrs. Bradley and Travis conclude that it is important to devise special control measures for various marshes or sections of marshes based on their special requirements, to which the vegetative cover is an index.

Ditch spacing a factor in reduction of mosquito larvae.--From data obtained on field studies conducted south of New Smyrna, Fla., by Messrs. Bradley and Travis, it was shown that ditches spaced at 75-foot intervals reduced breeding 91 percent; 150-foot spacings gave reductions of 87 percent and 18 percent, respectively, for two sections; and no reduction was noted where ditches were spaced at 300-foot intervals. This experiment further demonstrates the necessity of devising control procedure based on the special requirements of an area.

Examination of turkeys for Leucocytozoon smithi.--During the last quarter of 1940, Mr. Travis examined 81 turkeys from 15 flocks in Volusia County and 7 turkeys from 2 flocks in Gilchrist County, Fla., to determine the incidence and distribution of the turkey parasite *L. smithi*. Of the 88 turkeys examined, only 6 birds from 2 flocks showed no parasites in the blood. Mr. Travis' survey showed all birds examined from rural locations to be infected and birds from urban locations to be free of parasites. In all flocks where birds were heavily infected the growers indicated losses of young birds.

Soil sampling for marsh mosquito surveys demonstrated in Dade and Broward Counties, Fla.--At the request of Fred Stutz, mosquito control director of the Mosquito Abatement District of Dade and Broward Counties, Messrs. Travis and Bradley demonstrated the soil-sampling method for marsh-mosquito surveys in Mr. Stutz's district early in December. Hatching of both *Aedes taeniorhynchus* (Wied.) and *Psorophora columbiae* D. & K. was obtained from samples of soil taken on ditch and furrow sides, hummocks, and pond rims. No hatching was obtained from extensive unditched, flat marl marshes.

Relation of malaria control to wildlife conservation.--A joint meeting of the Technical and Policy Committees of the Tennessee Valley Authority, held in Knoxville, Tenn., on December 6, was attended by F. C. Bishopp and W. V. King. At this meeting consideration was given to the results obtained during the last 2 years and approval was given for the publication of some of the completed work. As the final action of the meeting a motion was passed to discontinue the present cooperative organization, but provision was made for continuation of the projects on a less formal basis.

Combination screwworm larvicides and wound protectors.--Roy Melvin, H. E. Parish, and C. L. Smith, of the Menard, Tex., laboratory, have summarized a study of approximately 100 mixtures of larvicides and organic chemical wound protectors. Of these, 12 smears have been developed and are now ready for large-scale field tests. These 12 compounds, in experiments on large, bloody cattle wounds, have, on the average, given not less than 3 days' initial protection and not less than a 10-day interval of protection between reinfestations, and have required not more than 4 treatments to heal the wound.

Seasonal appearance and abundance of cattle grubs.--A cross-section survey was made in the vicinity of Dallas, Tex., by E. W. Laake and W. G. Bruce, of the Dallas laboratory, to determine the seasonal appearance and abundance of cattle grubs in dairy cattle. The survey revealed that the first grubs appeared somewhat later than usual and that the heaviest infestations were in cattle on upland farms. On December 13, when 181 grubs were carefully staged, the development was as follows: 9.4 percent of the larvae were in the first stage, 71.8 percent in the second stage, and 18.8 percent in the third stage. The abundance of grubs in mid-December in an average herd on an upland dairy farm was as follows: 20.9 percent of the cows were uninfested; 53.5 percent had from 1 to 10 grubs per head; 18.6 percent had from 11 to 20 grubs per head; 4.7 percent had from 21 to 30 grubs per head; and 2.3 percent had more than 30 grubs per head. Cattle grub control experiments were started in the vicinity of Dallas the second week of December.

Experimental dipping for control of cattle grubs.--Three groups of cattle were dipped in the standard sulfur-cube dip and in modifications of it to test its efficacy against cattle grubs. These tests were made by R. W. Wells, of the Dallas laboratory. Clearly, about 40 percent of the grubs in cattle dipped once failed to survive the standard dip, while it was indicated less clearly that from two dippings a destruction of 75 percent of the grubs may be expected.

FOREIGN PLANT QUARANTINES

Another bruchid intercepted in vetch.--Live bruchids infesting vetch seed from Rumania, intercepted in foreign mails at New York, were identified by H. S. Barber, of the Division of Insect Identification, as Bruchus sp., near rufipes Hbst. Mr. Barber remarks that this appears to be a form not hitherto recognized in the National Museum's collection.

Imported live European corn borers, $1 per pound.--On December 12 two sample packages of living larvae of the European corn borer (Pyrausta nubilalis Hbn.), one sent to a pet shop and the other to a gold fish company in San Francisco, were intercepted by a Customs mail examiner. A company in Tientsin, China, had sent the samples with a mimeographed letter stating that they were in position to furnish large quantities of these live "worms" for bird food from October to April at $1 per pound f.o.b. San Francisco, including packing, in lots up to 3 pounds. Shipments of more than 4 pounds were offered to be sent c.o.d. A similar mail shipment was intercepted at Baltimore on December 17. Although these samples contained only about 20 larvae each, with corn-husk packing, it is not known whether or not all have been intercepted, and 20 mature larvae could easily start a serious infestation if given an opportunity. Again our thanks are given to the Customs personnel for stopping a dangerous plant pest.

Entomological interceptions of interest.--Adults of the lygaeid Peritrechus fraternus Uhl. were taken from lettuce found in passenger's baggage from Mexico at El Paso, Tex., on November 20 and 25. Lettuce was the host for an adult of the pentatomid Thyanta accerra McA., which was found in baggage arriving from Mexico at Laredo on November 19. At Nogales, Ariz., on July 20 there was a live adult of Euphrytus parvicollis Schaef.

taken from mustard greens arriving in baggage from Mexico. H. S. Barber states that this chrysomelid is new to the Museum's collection. On November 16 at New York an inspection of ship's stores revealed apples from Portugal infested with live larvae of *Ceratitis capitata* (Wied.). A live adult of *Chelymorpha pubescens* Boh. was intercepted on bananas from Mexico which arrived at New Orleans on September 11. A live adult of the lygaeid *Exptochiomera fuscicornis* (Stal) was found at Brownsville on November 2 on cockscomb flowers from Mexico. Live larvae of the pink bollworm (*Pectinophora gossypiella* (Saund.)) were intercepted from okra carried in ship's stores which arrived at Boston, Mass., on November 30. Tangerine fruit infested with one live larva of the Mediterranean fruitfly (*Ceratitis capitata* (Wied.)) was intercepted at New York on December 4 in baggage from Portugal. Two living larvae of *Heilipus lauri* (Boh.) were found in avocado seed in baggage arriving at Laredo, Tex., on December 1 from Mexico. From grapefruit in stores living pupae and larvae of *Anastrepha fraterculus* (Wd.) were intercepted at Boston on December 16. The fruit originated in Argentina. Living and dead adults of *Bruchidius incarnatus* (Boh.) were found at New York in *Vicia faba* beans arriving from Egypt in stores on October 19. Mr. Bridwell states that this bruchid does serious injury to broadbeans in Egypt.

Pathological interceptions of interest.--A *Cercospora* intercepted on zinnias from Mexico on October 11 and again on December 7, 1940, at Brownsville has been determined as *C. zinniae* E. & M., although the spores are larger than had been reported for the species. *Mycosphaerella citrullina* (Smith) Gross. was found on November 22 at New York on squashes in stores from Japan. *Nectria* sp. was intercepted November 2 at Brownsville on a gardenia twig from Mexico, the tropical and subtropical species of the fungus being so inadequately worked up that determination to species would be a difficult task, requiring ample good material. *Septoria musiva* Pk. was intercepted on October 31 at El Paso on cottonwood leaves in baggage from Mexico. A group of protuberances making a gall-like growth several millimeters in diameter was intercepted on November 11 on stems mixed with grass packing from Mexico in a shipment entering at Nogales. Preliminary examination showed that the protuberances were filled with smut spores and the specialist reports that it appears to be *Thecaphora pustulata* Clinton, heretofore known only from two Puerto Rican collections on *Bidens* sp.

DOMESTIC PLANT QUARANTINES

Grasshopper bait used last year.--According to reports made by the State leaders in grasshopper control for the year 1940, more than 91,000 farmers used bait in 22 States, the largest number of farmers participating in the States of Minnesota, Nebraska, North Dakota, South Dakota, Montana, and Kansas. There were 63,673 dry tons of bait distributed by volunteer and paid labor in 1940, the bulk of which was distributed in Montana, Minnesota, North Dakota, South Dakota, Texas, Colorado, and California, in the order named.

Field headquarters for peach projects and citrus canker combined.--The consolidation of the peach mosaic, phony peach, and citrus canker projects has been effected with headquarters at 561 Federal Building, San Antonio. Tex. A. E Cavanagh, formerly in charge of control activities relating to peach diseases, with headquarters at Little Rock, Ark., is now in charge of the consolidated project. R. N. Dopson, who has been in charge of citrus canker eradication, will continue to direct the field work of that project under Mr. Cavanagh's supervision, and will also act in a similar capacity in peach mosaic and phony peach activities in Texas and nearby States. The office at Houston, Tex., formerly the headquarters for the citrus canker project, will be maintained as a suboffice for that work in Texas and Louisiana.

Tree-removal work for peach disease control.--During the month of December the destruction of abandoned, escaped, and diseased peach trees went forward in Arizona, California, Georgia, New Mexico, and Texas. In California all mosaic-infected trees have now been removed, with the exception of 359 trees on 4 properties. In Georgia more than 9,000 phony trees were removed by the property owners during the month.

Chinch bug outlook.--Preliminary estimates of the chinch bug situation as determined from the survey completed in December, indicate that infestations in Iowa and Nebraska next year will be lighter and more spotted than in 1940, and that the center of the infestation has moved to the north and west, where winter mortality will probably be heavier. In Kansas and Oklahoma, surveys indicate that the infestation will cover larger areas than last year and may be more intense. In Illinois and Indiana the situation has not changed appreciably from that indicated by last year's survey and it is not believed that there will be any serious outbreaks in Ohio. Chinch bug infestations of a moderate intensity were also found in a small area in the southeastern corner of South Dakota, involving approximately four counties. With weather conditions and population developments comparable to those of 1940, it is estimated that approximately 350,000,000 gallons of creosote oil will be needed next year. This figure may be more than doubled or drastically reduced by weather conditions during the spring months.

Survey for Parlatoria chinensis (Marl.).--Inspections in the city of St. Louis during December, by 8 Bureau inspectors in cooperation with inspectors of the Missouri State Department of Agriculture, disclosed a heavily infested area of approximately 94 city blocks in the immediate vicinity of the Missouri Botanical Garden and Tower Grove Park. Findings indicated that the infestation is centered in or near the botanical garden and diminishes or disappears within a distance of approximately 6 blocks. Inspections of isolated points throughout the city, particularly of those places to which plants from the infested areas have been moved, or are suspected of having been moved, such as cemeteries, other parks, and nurseries, have disclosed no additional infestations, with the exception of 1 infestation immediately north of Forest Park. The scale has been taken from a number of different plants, including althea, lilac, euonymus, privet, purple leaf plum, rose, sumac, peach, flowering currant, apple, and willow. Collections do not indicate any particular plant as a favored host.

Mole cricket control.--The distribution of bait for the control of mole crickets in 11 counties in Florida was discontinued on December 14, as it was felt by all concerned that the best interest of the growers had been served. Mixers were dismantled and stored and surplus bait materials were also stored. During the 12 weeks of operation of the project, September 25 to December 14, over 2,500,000 pounds of mixed bait was distributed from four mixing stations located at Plant City, Lakeland, Wauchula, and Palatka, Fla. Growers and county and State authorities were unanimous in their expression of appreciation for the assistance rendered in controlling the serious outbreaks of mole crickets during the fall months. Without such assistance, it is indicated that many plantings of vegetables and strawberries would have been either completely destroyed or very severely damaged.

White-fringed beetle control.--A few adult beetles of Pantomorus leucoloma Boh. and P. peregrinus Buch. were reported still active in the field at the close of December. Clearing work, with the assistance of W. P. A. crews, went forward in various infested areas in Alabama, Florida, and Mississippi. Over 800 acres was cleared for control operations in the month of December.

Sweetpotato weevil eradication.--Summing up the situation at the close of 1940, it is found that considerable progress had been made in the eradication of the sweetpotato weevil infestations since the project was begun in July 1937, jointly with the States, in designated commercial areas of Alabama, Georgia, Mississippi, and Texas, as shown by the following table.

State	Infested properties, 1937-40	
	Located	Released from quarantine
	Number	Number
Alabama	426	399
Georgia	75	69
Mississippi	530	491
Texas	187	182

Of the total of 1,218 infested properties located in the last 3½ years, 1,141, or 93.6 percent, have been released from quarantine as apparently free from the weevils.

Transit inspection.--Seven additional inspectors were assigned to the Northeastern States region to assist in the inspection of Christmas greens moving from the gypsy moth and brown-tail moth infested area during December. As a result of the augmentation of the regular force by these inspectors, 315 apparent violations of quarantine 45 were reported by the inspectors in this region during December. The inspection covered not only the mail, express, and freight, but the movement of Christmas greenery into the New York City markets by trucks and boats. Several mislabeled and misrepresented parcels were noted as containing material in violation of quarantine 45. Some outstanding examples were a shipment marked "artificial flowers," which was found to contain hemlock and white pine branches with cones; another labeled "cut flowers" contained holly branches, wreaths, and evergreen corsages; from a florist came a boxwood wreath which bore the statement "no inspection necessary." One case of boughs was waybilled as "case of ferns." A consignment labeled "rush, perishable fruit" contained apples and oranges attached to a balsam wreath. One carton covered with stickers reading "glass" and "fragile" was found to contain balsam wreaths. The inspectors from all regions reported a decided increase in the movement of mail and express during the last year, with the 1940 Christmas rush showing from 12- to 25-percent increase over previous years. Additional inspectors were assigned to several points in the Southern States, and a very thorough check was maintained on shipments of peach and plum nursery stock moving from the areas infected with phony peach and peach mosaic. This special inspection was discontinued on December 21.

Citrus canker recurs in Texas.--Citrus canker was found early in December in the outskirts of Alta Loma, Galveston County, on a small Citrus trifoliata seedling. It has been nearly 6 years since the premises were first found infected, and since that time the disease has not been found there, although the place has been intensively worked each year. The current infection was located some 300 yards from the spot where the diseased tree of 1935 stood. A photograph of the old tree shows that there was a bird's nest in it and most of the canker found in the tree that year was about the nest. It seems possible that the birds might have spread the infection. All the inspectors were promptly assigned to reinspect and recheck the entire town of Alta Loma, and the W. P. A. laborers to clean vacant lots, ditch banks, and fence lines in order to expose any other small seedlings present.

CONTROL INVESTIGATIONS

Sex of cockroach influences resistance to pyrethrins.--The toxicity to adult American cockroaches (Periplaneta americana L.) of pyrethrins dissolved in refined kerosene was investigated by E. R. McGovran and E. L. Mayer and they report that the female roaches were more resistant to the pyrethrins than were the males. The kerosene solution of pyrethrins, which was prepared by the Division of Insecticide Investigations, was applied with a micropipette to the dorsal integument of the thorax between the bases of the wings, which were spread apart during the application. To each female roach 0.006 milliliter of kerosene containing the pyrethrins was applied and 0.0045 milliliter to each male. The average body weight of the females was 1.208 grams and of the males 0.913 gram. It can readily be seen from these figures that the volume of kerosene and the amount of pyrethrins applied was proportional to the body weight of each sex and at approximately the rate of 0.005 milliliter of solution per gram of body weight of the insects. When a kerosene solution of pyrethrins containing approximately equal amounts of pyrethrins I and II, and 0.5 milligram of total pyrethrins per milliliter of refined kerosene was used, 81 percent of the male roaches treated were killed, as compared with 53 percent of the females. Refined kerosene that contained no pyrethrins when applied to the roaches at the same rate caused no mortality of the males and 7 percent mortality of the females. When a solution containing 1.0 milligram of total pyrethrins per milliliter was applied, it caused 83 percent mortality of females and 100 percent mortality of males. At this 81- to 83-percent level of mortality, which was caused by 0.5 milligram per milliliter of pyrethrins on male roaches, and 1.0 milligram per milliliter on female roaches, it is evident that the female roaches were twice as resistant as the male roaches to the pyrethrins in the refined kerosene. When 0.75 milligram per milliliter of total pyrethrins was used on the males and 1.5

milligrams per milliliter was used on the females, mortalities of 92 percent and 96 percent were caused. At this high level of mortality the females appeared approximately, or possibly slightly less than, twice as resistant as the males. At a lower level of mortality, where 53 percent of the females and 67 percent of the males were killed by 0.5 milligram per milliliter and 0.25 milligram per milliliter of total pyrethrins, respectively, the lower mortality of the females at double the concentration of pyrethrins, as compared with that of the male roaches, indicates that the females were more than twice as resistant to the pyrethrins as the males.

INSECTICIDE INVESTIGATIONS

McIndoo appointed bibliographer for Division.--Because of his wide scientific training, coupled with his successful research experience of many years, N. E. McIndoo has been transferred to this Division for the purpose of pursuing library research on insecticides and related subjects. Until this transfer on December 1, 1940, Mr. McIndoo had been connected with the Division of Control Investigations. In his new assignment he will be engaged in the writing of critical reviews and the compilation of bibliographies of insecticides and allied subject matter, such as attractants and repellents. In this capacity he will abstract and digest the information on these materials found in the entomological, chemical, medical, and agricultural journals. As is well known, the published reports of tests of insecticides and their physiological effects upon insects, as they appear in their original journal articles, are published in many languages and are inadequately treated in the abstract journals, and it will be necessary for Mr. McIndoo to make a wide search of the literature. On the basis of the classified abstracts so prepared, he will publish critical reviews on the insecticidal uses of inorganic and organic materials of both plant and synthetic origin, in an effort to guide the research endeavors of the Bureau's chemists and entomologists who are striving to develop new insecticides and to improve those in current use.

Work on testing of new insecticides on goldfish transferred to Division of Control Investigations.--The toxicity tests, employing the goldfish as the test animal, of various insecticidal compounds developed by the chemists of this Division are now being conducted in the Division of Control Investigations, where similar studies are being made except that in that Division insects have always been used for the tests. W. A. Gersdorff, who was in charge of these toxicity tests while they came within the jurisdiction of the Division of Insecticide Investigations, was transferred on December 1, 1940, to the Division of Control Investigations, where he will continue his studies along this line.

BEE CULTURE

Initiation of brood rearing probably not a temperature response.--Warren Whitcomb, Jr., of University, La., reports: "Brood rearing of bees in Louisiana follows rather closely the same trends as in more northern localities and is ordinarily characterized by a broodless period during December and January. Colonies which are abnormal in some respect may continue, or initiate, brood rearing during such normally broodless periods. Feeding tests now in progress indicate that this broodless period can be changed by proper feeding and that brood rearing may be continuous. Evidently the initiation, or cessation, of brood rearing is a food, and not a temperature response."

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Wild hosts of sweetpotato weevil.--A long series of the sweetpotato weevil (Cylas formicarius (F.)), from Sunset, La., was recently received from K. L. Cockerham, of the Division of Truck Crop and Garden Insect Investigations, for verification of name. The lot is of unusual interest in that it includes specimens reared from five wild host plants, namely, Ipomoea hederacea, I. trichocarpa, I. pandurata, I. barbigera, and I. quamoclit. Although the National Collection contains a good series of the sweetpotato weevil, nearly all the specimens are either unlabeled as to host or are stated to be from sweetpotato. The need of full and accurate data on the native or wild hosts of economic insects, and the practical utility of such information in relation to control measures, is apparent, but such records are also of much value in the taxonomic study of insect groups.

Apparent extension of range of an introduced European weevil.--The European barine curculionid, Cosmobaris scalopacea (Germ.), has been known from the Northeastern States for at least 40 years, and more recently has been reported from Illinois, Michigan, and Iowa. During May 1939, P. C. Ting collected two specimens of this species near Tracy, Calif., about 50 miles east of San Francisco, on cattails (Typha). The species has been reared from the stems of Chenopodium at Hyattsville, Md., by W. H. Anderson, and has been taken from stems of Chenopodium at Huntington, N. Y., by J. C. Bridwell. In Europe it has been reported from several other genera of Chenopodiaceae, including Salsola, Corispermum, Salicornia, Suaeda, and Atriplex.

Uncommon grasshoppers occasionally found in abundance.--During the summer of 1940, J. F. G. Clarke, of this Division, made a collection of Orthoptera, in the course of general collecting in the State of Washington, which is very helpful. Numerous species are included, but especially good series of the relatively uncommon Eremiacris pallida (Bruner), Bradynotes caurus Scudd., and Asemoplus rainierensis Caud. Among the more desirable Orthoptera occurring in partially wooded or alpine areas are wingless or short-winged grasshoppers, which are sometimes found literally swarming. As many of them are poorly represented in most collections and some are significant in the classification of more economically important species, it is advisable to take advantage of opportunities when these usually rare grasshoppers may be collected in abundance. Large series, consisting of 100 specimens or more per species, for instance, are desired in studying variation.

The quill-infesting chigger of chickens.--Sylvio Torres, eminent Brazilian parasitologist, now touring in the United States, visited the Division of Insect Identification and left several samples of the South American quill-infesting chigger (Apolonia tigipioensis Tor. & Braga) for the National collection. This chigger enters the young quill before the terminal opening closes and continues to feed long after the feather develops, causing the latter to break off near its base. After the feather is gone, a tumor develops about the quill base, becoming very conspicuous on the deplumed area about it.

Two hemipterous predators upon the corn ear worm.--Specimens of two species of the hemipterous family Anthocoridae were recently received for identification through the Division of Cotton Insect Investigations, with the report that they had been collected on cotton in the Canete Valley, Peru, in December by B. R. Coad. A note by Mr. Coad accompanying the material stated that these insects are remarkably effective as predators upon the eggs and newly hatched larvae of Heliothis. Observations indicated that fully 95 percent of the eggs had been destroyed and that, although there had been heavy egg deposition, it was almost impossible to locate Heliothis larvae. These predators have been identified by H. G. Barber as Cardiastethus assimilis (Reut.) and Paratriphleps laeviusculus Champ. The former was originally described from Texas, the latter from Panama.

Food-plant record for a coreid bug.--James Zetek, of the Division of Fruitfly Investigations, recently submitted for determination a number of specimens of the large coreid bug, Pachylis pharaonis Herbst, which he states is very abundant on Bougainvillea glabra Choisy in the Canal Zone. Apparently this is the first record of the food plant of Pachylis pharaonis.

---oOo---

UNIVERSITY OF FLORIDA
3 1262 09244 5120